

## Claims

- [c1] What is claimed is:
1. A multi-channel wireless audio system comprising:
    - a signal broadcasting circuit comprising:
      - a multiplexer having a plurality of input nodes and one output node, each input node being used to receive audio signals of an audio channel, the output node being used for outputting audio signals of a selected audio channel;
      - an analog to digital converter for converting the audio signals of the selected audio channel into digital audio signals; and
      - a first transceiver for wirelessly transmitting the digital audio signals to external speakers; and
    - a plurality of wireless speaker modules each comprising:
      - a second transceiver for receiving the wireless digital audio signals from the signal broadcasting circuit;
      - a digital to analog converter for converting the digital audio signals into analog audio signals;
      - an amplifier for amplifying the analog audio signals; and
      - a speaker for converting the amplified analog audio signals into sound.
  - [c2] 2. The audio system of claim 1 wherein the signal broadcasting circuit further comprises a packaging and compressing circuit for compressing the digital audio signals outputted from the analog to digital converter and dividing the signals into packages before wireless transmission by the first transceiver.
  - [c3] 3. The audio system of claim 2 wherein the signal broadcasting circuit further comprises a digital signal processor (DSP) for controlling operation of the packaging and compressing circuit.
  - [c4] 4. The audio system of claim 1 wherein the signal broadcasting circuit further comprises a sampling and control circuit for controlling operation of the multiplexer and the analog to digital converter.
  - [c5] 5. The audio system of claim 1 wherein each wireless speaker module further comprises a processor for controlling operation of the wireless speaker module.

- [c6] 6.The audio system of claim 5 wherein each wireless speaker module further comprises a channel selector for identifying a selected audio channel, and the processor of the wireless speaker module processes only those digital audio signals corresponding to the selected audio channel.
- [c7] 7.The audio system of claim 5 wherein each wireless speaker module further comprises a diagnostic circuit for detecting performance problems in the amplifier and the speaker, and for notifying the processor of any problems.
- [c8] 8.The audio system of claim 1 wherein each wireless speaker module further comprises a timing control circuit for controlling timing of the digital to analog converter.
- [c9] 9.The audio system of claim 1 wherein the wireless digital signals transmitted from the signal broadcasting circuit to the plurality of wireless speaker modules are direct sequence spread spectrum signals.
- [c10] 10.The audio system of claim 1 wherein the wireless digital signals transmitted from the signal broadcasting circuit to the plurality of wireless speaker modules conform to the IEEE 802.11b networking standard.
- [c11] 11.A multi-channel wireless audio system comprising:  
a signal broadcasting circuit comprising:  
a multiplexer having a plurality of input nodes and one output node, each input node being used to receive audio signals of an audio channel, the output node being used for outputting audio signals of a selected audio channel;  
an analog to digital converter for converting the audio signals of the selected audio channel into digital audio signals; and  
a first transceiver for wirelessly transmitting the digital audio signals to external speakers; and  
at least one multi-channel wireless speaker module comprising:  
a second transceiver for receiving the wireless digital audio signals from the signal broadcasting circuit;  
a plurality of digital to analog converters for converting digital audio signals into analog audio signals;

a plurality of amplifiers for amplifying the analog audio signals; and  
a plurality of speakers for converting the amplified analog audio signals into  
sound.

[c12] 12.The audio system of claim 11 wherein the signal broadcasting circuit further  
comprises a packaging and compressing circuit for compressing the digital  
audio signals outputted from the analog to digital converter and dividing the  
signals into packages before wireless transmission by the first transceiver.

[c13] 13.The audio system of claim 12 wherein the signal broadcasting circuit further  
comprises a first digital signal processor (DSP) for controlling operation of the  
packaging and compressing circuit.

[c14] 14.The audio system of claim 11 wherein the signal broadcasting circuit further  
comprises a sampling and control circuit for controlling operation of the  
multiplexer and the analog to digital converter.

[c15] 15.The audio system of claim 11 wherein each wireless speaker module further  
comprises a processor for controlling operation of the wireless speaker module.

[c16] 16.The audio system of claim 15 wherein each wireless speaker module further  
comprises a channel selector for identifying a plurality of selected audio  
channels, and the processor of the wireless speaker module processes only  
those digital audio signals corresponding to the selected audio channels.

[c17] 17.The audio system of claim 15 wherein each wireless speaker module further  
comprises a diagnostic circuit for detecting performance problems in the  
amplifiers and the speakers, and for notifying the processor of any problems.

[c18] 18.The audio system of claim 11 wherein each wireless speaker module further  
comprises a timing control circuit for controlling timing of the digital to analog  
converters.

[c19] 19.The audio system of claim 11 wherein the wireless digital signals transmitted  
from the signal broadcasting circuit to the plurality of wireless speaker modules  
are direct sequence spread spectrum signals and conform to the IEEE 802.11b  
networking standard.

[c20]

20.A multi-channel wireless audio system comprising:

a signal broadcasting circuit comprising:

a plurality of analog to digital converters, each for converting audio signals of a selected audio channel into digital audio signals; and

a first transceiver for wirelessly transmitting the digital audio signals to external speakers; and

a plurality of wireless speaker modules each comprising:

a second transceiver for receiving the wireless digital audio signals from the signal broadcasting circuit;

a digital to analog converter for converting the digital audio signals into analog audio signals;

an amplifier for amplifying the analog audio signals; and

a speaker for converting the amplified analog audio signals into sound.